An Economic Analysis of the Malaysian Palm Oil Market

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ABSTRACT

The objectives of the study are to describe a national model of the Malaysian palm oil market and to identify the important factors affecting the Malaysian palm oil industry. The model is estimated by taking into account total oil palm area, oil palm yield, domestic consumption, exports and imports over the period of study between 1970 and 1999. The results show the importance of the Malaysian economic activity, the exchange rate and world population in affecting the palm oil industry. Other factors are palm oil stock level, price of palm oil, technological advancement in production technique and the price of soyabean oil

INTRODUCTION

The objectives of this study are to describe a model of the Malaysian palm oil market and to identify the important factors affecting the Malaysian palm oil industry. The following section constructs the model of Malaysian palm oil market, and the final section gives the conclusion and discusses some of the implications from its empirical results.

MODEL SPECIFICATION

The model focuses on the domestic features of the Malaysian palm oil sector with the inclusion of imports and exports to measure its performance in international trade in palm oil. This national model is developed with a dynamic specification, *i.e.* the inclusion of rational expectations and partial adjustment as well as monetary factors such as inflation and exchange rates.

Area

The specification of an area equation for palm oil is based on the stock adjustment sub-model for perennial crops, which can be found in Bateman(1965),Behrman (1968) and French and Matthews (1971) among others. The desired oil palm area in year t is related to expected real domestic price of palm oil and the expected real domestic price of natural rubber as an alternative

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production commodity. The equation can be written as follows:

$$A_t^* = a_0 + a_1\,RMPPO_t^e + a_2\,RMNRP_t^e + u_{1t} \qquad (1.1)$$

where

A_t^* = the desired number of hectares of oil palm area in year t ('000 hectares)
$RMPPO_1^e$ = the expected real Malaysian price of palm oil in year t (RM/tonne)
$RMNRP_1^e$ = the expected real Malaysian price of natural rubber in year t (RM/tonne)
$a_1\,a_2$ = regression coefficients

The actual oil palm area (A_t) is assumed to be adjusted in proportion to the difference between the desired long-term equilibrium and the actual area in the previous year, as follows:

$$A_t - A_{t-1} = \alpha\,(A_t^* - A_{t-1}) \qquad 0 < \alpha \leq 1 \qquad (1.2)$$

where

A_t = area of oil palm in year t
A_t^* = desired area of oil palm in year t
A_{t-1} = area of oil palm in year t-1
α = the adjustment coefficient for the area of oil palm

It is assumed that the oil palm producers form their expectations concerning the future prices through a simple adaptive expectation model relating to actual prices:

$$RMPPO_t^e - RMPPO_{t-1}^e = \beta(RMPPO_t - RMPPO_{t-1}^e) \qquad (1.3a)$$

$$RMNRP_t^e - RMNRP_{t-1}^e = \theta(RMNRP_t - RMNRP_{t-1}^e) \qquad (1.3b)$$

Since the adjustment coefficient for rubber price (β) in (1.3a) is different from the adjustment coefficient for the price of palm oil (θ) in (1.3b), and to simplify the estimation but not to distort reality seriously, it is assumed that the adjustment coefficients β and θ are one and the same (Bateman, 1969). Thus, equations (1.3a) and (1.3b) can be combined with equations (1.1) and (1.2) to eliminate the price expectation and the desired number of area variables. The area planted equation where the total area is the dependent variable is as shown below. A technological variable, $TIME_t$, is also included to consider the contribution of this factor in determining the total hectares of oil palm.

$$A_t = a_0\alpha\beta + [(1-\beta) + (1-\alpha)]\,A_{t-1} - (1-\beta)(1-\alpha)\,A_{t-2} + a_1\alpha\beta RMPPO_t + a_2\alpha\beta RMNRP_t + a_3 TIME_t + v_{1t} \qquad (1.4)$$

where the error term $v_{1t} = \alpha u_t - \alpha(1-\beta)u_{t-1}$

Yield

As for many other crops, the desired yield of FFBs of oil palm is normally assumed to depend on the technological advancement of its production. The discovery of new high yielding varieties, improvements in planting techniques and increasing use of fertilizers and chemicals increase yield. Yield variations are also not only determined by uncontrollable variables such as weather but by changes in economic conditions such as price variables which are either contemporaneous or with short lags (Hallam, 1990). Therefore, the desired yield equation of palm oil is written as follows:

$$YDL_t^* = c_0 + c_1 RMPPO_t + c_2 RMPPO_{t-1} + c_3\,TIME_t + u_{3t} \qquad (2.1)$$

where

YDL_t^* = desired yield of oil palm in year t (tonnes/hectare)
$RMPPO_t$ = real price of palm oil in year t (RM/tonne)
$RMPPO_{t-1}$ = real price of palm oil lagged one year (RM/tonne)
$TIME_t$ = time trend as a proxy of technological improvements
u_{3t} = stochastic error term normally and independently distributed

It is further assumed that the actual yield, YLD_t adjusts in proportion to the difference between the desired yield for time t and the previous actual yield.

$$YLD_t - YLD_{t-1} = \lambda(YLD_t^* - YLD_{t-1}) \qquad (2.2)$$

where λ = the adjustment coefficient for the yield of oil palm

When this equation is combined with (2.1), the result is

$$YLD_t = c_0\lambda + (1-\lambda)YLD_{t-1} + c_1\lambda RMPPO_t + c_2\lambda RMPPO_{t-1} + c_3\lambda\,TIME_t + \lambda u_{3t} \qquad (2.3)$$

where λu_{3t} = stochastic error normally and independently distributed

Domestic Consumption

Palm oil is used as input in final food and non-food products, for example in the manufacture of cooking oil and margarine, as well as soaps, candles, *etc.* The desired domestic consumption for palm oil can be specified as depending on its real domestic price, previous year consumption, the real price of coconut oil as a substitute, and the Malaysian industrial production index as a proxy for the level of economic activity.

$MC_t^* = d_0 + d_1 RMPPO_t + d_2 RMPCO_t + d_3 MIPI_t + u_{4t}$
(3.1)

where

MC_t^* = desired domestic consumption ('000 tonnes)
$RMPPO_t$ = real domestic price of palm oil (RM/tonne)
$RMPCO_t$ = real domestic price of coconut oil (US$/tonne)
$MIPI_t$ = Malaysian industrial production index (1990=100)
u_{4t} = stochastic error term normally and independently distributed

Since consumers in general do not respond immediately to changes in demand-determining factors, the actual consumption is assumed to adjust partially towards desired consumption. Desired domestic consumption for palm oil is assumed to follow the partial adjustment process as follows:

$$MC_t - MC_{t-1} = \chi(MC_t^* - MC_{t-1}) \quad 0 < \chi \leq 1 \qquad (3.2)$$

where χ is the coefficient of adjustment, which is assumed positive. Substitution of equation (3.1) into equation (3.2) yields an estimating equation for domestic consumption.

$$MC_t = d_0\chi + (1-\chi)MC_{t-1} + d_1\chi RMPPO_t + d_2\chi RMPCO_t + d_3\chi MIPI_t + \chi u_{4t} \qquad (3.3)$$

Exports

Following Labys (1975) and Adams and Behrman (1976; 1978), a dynamic equation of exports of Malaysian palm oil can be derived as:

$$EXP_t^* = e_0 + e_1 RMPPO_t + e_2 RWPSO_t + e_3 WPOP_t + e_4 MEXC_t + e_5 IPIIC_t + u_{5t} \qquad (4.1)$$

$$EXP_t - EXP_{t-1} = \varepsilon(EXP_t^* - EXP_{t-1}) \quad 0 \leq \varepsilon \leq 1 \qquad (4.2)$$

where

EXP_t^* = desired exports of palm oil ('000 tonnes)
EXP_t = actual export of palm oil ('000 tonnes)
$RMPPO_t$ = real domestic price of Malaysian Palm oil (RM/tonne)
$RWPSO_t$ = real world price of soybean oil (US$/tonne)
$WPOP_t$ = world population (million)
$MEXC_t$ = Malaysian exchange rates (RM/US$)
$IPIIC_t$ = industrial production index of indus-trialised countries (1990=100)
u_{5t} = stochastic error term normally and independently distributed

Soyabean oil is assumed to be the closest substitute for palm oil, and its cross price elasticity is thus expected to be positive. Foreign demand for Malaysian palm oil is expected to increase with growth in world population and with world economic activity, which is represented by the industrial production index of industrialised countries. A fall of the Malaysian Ringgit compared with the US Dollar would mean that Malaysian palm oil is cheaper, and this would increase the foreign demand for palm oil. By substituting (4.1) into (4.2), the final equation for Malaysian exports of palm oil is as follows:

$$EXP_t = e_0\varepsilon + (1-\varepsilon)EXP_{t-1} + e_1\varepsilon RMPP0_t + e_2\varepsilon RWPS0_t + e_3\varepsilon WPOP_t + e_4\varepsilon MEXC_t + e_5\varepsilon IPIIC_t + \varepsilon u_{5t} \quad (4.3)$$

From the equations for domestic consumption (3.3) and total exports (4.3) above, the total consumption of Malaysian palm oil, TC_t, is developed as an identity:

$$TC_t = MC_t + EXP_t \qquad (4.4)$$

Imports

As described by Labys (1973), in order to reflect trading in the international market, a country model should include exports (4.3) as well as imports. Even though the amount of Malaysian imports is small, palm oil is imported, mainly from Indonesia, due to its lower price and the surplus capacity of refineries in Malaysia. Thus, the desired import equation of palm oil can be postulated as:

$$IMP_t^* = f_0 + f_1 RMPPO_t + f_2 MIPI_t + f_3 RWPPO_t + f_4 MBSTK_t + u_{6t} \qquad (5.1)$$

where

$IMP_t - IMP_{t-1} = \Phi(IMP_t^* - IMP_{t-1}) \quad 0 < \Phi < 1$ (5.2)
IMP_t^* = desired import demand of palm oil ('000 tonnes)
IMP_t = actual import demand of palm oil ('000 tonnes)
$RMPPO_t$ = real domestic price of palm oil (RM/tonne)
$MIPI_t$ = Malaysian industrial production index
$RWPPO_t$ = real world price of palm oil (US/tonne)
$MBSTK_t$ = beginning stocks of Malaysian palm oil ('000 tonnes)
$f_0 f_1 \ldots f_4$ = regression coefficients
u_{6t} = stochastic error term normally and independently distributed

The signs of the coefficients for Malaysian economic growth represented by Malaysian industrial production index, domestic price and world price of palm oil are all expected to be positive. The sign for stocks of palm oil is expected to be negative, since imports tend to increase as Malaysian stocks level of palm oil become lower. Combining equations (5.1) and (5.2) for IMP_t yields the estimating equation as:

$$IMP_t = f_0\Phi + (1-\Phi)IMP_{t-1} + f_1\Phi RMPPO_t + f_2\Phi MIPI_t + f_3\Phi RWPPO_t + f_4\Phi MBSTK_t + \Phi u_{6t} \quad (5.3)$$

where Φ = regression coefficients

Since yearly data of stocks of palm oil are stated as ending stocks, beginning stocks of palm oil in the current year are assumed equal to lagged one year ending stocks of palm oil $MESTK_{t-1}$, as below:

$$MBSTK_t = MESTK_{t-1} \quad (5.4)$$

Finally, the model is closed with an identity determining the balance of total production, beginning stocks and imports with total domestic consumption, exports and ending stocks of palm oil.

$$MQ_t + MBSTK_t + IMP_t = MC_t + EXP_t + MESTK_t \quad (5.5)$$

DATA SOURCES AND ESTIMATION METHODS

Annual data used in this study were obtained from the Ministry of Primary Industries, Malaysia (1995), PORLA (1988), PORIM (1995), Malaysian Palm Oil Board (MPOB) (2000), Oil World (1994; 1995) and International Monetary Fund (IMF) (1994; 1995; 1996; 2000). Basically, the data used in this study are from 1968 to 1999, but the actual data range depended on the number of lags used. The real prices of Malaysian palm oil were calculated by deflating nominal prices of Malaysian palm oil by the Malaysian consumer price index or CPI (1990=100). The price of world coconut oil in U.S. Dollar times the Malaysian exchange rate was used as the domestic price. The Malaysian CPI then deflated all these prices. The world CPI was used as the deflator for world prices of palm oil and soyabean oil.

Initially, all the area, yield, domestic consumption, exports and imports equations were estimated using ordinary least squares (OLS). The equations were estimated with the assumption of independence among the exogenous variables and error terms with zero mean and constant variance. However, since the equations contain lagged dependent variables, OLS yields biased estimates since the residuals are autocorrelated. Therefore, a test for the incidence of autocorrelation was applied in these equations. OLS can continue to be used even in equations containing lagged dependent variables, provided that the disturbance term is serially independent (Johnston, 1984). However, due to the fact that some of the equations were also determined by endogenous variables, the two stage least squares (2SLS) technique is more suitable than OLS. Thus, 2SLS with the principal component technique with only selected predetermined variables was used in the first stage of the 2SLS procedure.

$\bar{R}^2$, F-statistic, t-statistic, Durbin-Watson (DW) and Durbin-h tests were used to evaluate the estimated model. The Durbin-h statistic was used to test for first-order autocorrelation when a lagged dependent variable was included as an explanatory variable in the regression. However, sometimes Durbin-h cannot be calculated since the number in the square root formula was negative. Therefore, Lagrange multiplier (LM) statistic was used as an alternative to test for the presence of first-order autocorrelation. The LM test statistic is usually taken to have a $\chi^2(1)$ distribution under this null hypothesis of no autocorrelation, and can be calculated as nR^2 from the test regression (Stewart and Gill, 1998). All the estimated results are discussed together with price elasticities calculated at the sample means. In this study, the price elasticities of palm oil are derived directly from 2SLS equations. The equations using 2SLS are also selected for further analysis because they produced better estimation results than OLS. All equations are in linear forms.

ESTIMATED RESULTS

Area

The OLS and 2SLS estimates of total area equation (1.4) under oil palm in Malaysia are presented in *Table 1*. The values of the F statistic, SEE and $\bar{R}^2$ show that the estimates are statistically acceptable. The Durbin-h statistic cannot be computed to test the presence of auto-correlation because it cannot take the square root of a negative number. However, from the LM test, the calculated $LM\chi^2(1)$ is 3.503. This value is smaller than 33.9, *i.e.* the critical value for a χ^2 distribution with 22 degrees of freedom at the 5% level. Thus, the null hypothesis of no auto-correlation is accepted revealing that there is no evidence of first-order auto-correlation.

The coefficients of specified variables follow the expected signs. For 24 degrees of freedom, the t critical points at 1% and 5% levels are 2.49 and 1.71 respectively. Total oil palm area lagged one year, current price of palm oil and technology in planting are statistically significant at the 1% level. Current domestic price of natural rubber is significant in determining the total oil palm area at 5% level. The 2SLS estimation con- firms the results in OLS as well as producing smaller SEE.

Table 2 presents short-run and long-run price elasticities of Malaysian palm oil area at the data means.

TABLE 1. ESTIMATED OIL PALM AREA EQUATION (1.4) OVER THE PERIOD 1970-1999, (n=30)

Variable	OLS		2SLS	
	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-46.000	-0.90	-57.289	-1.21
A_{t-1}	1.142	5.51**	1.155	6.20**
A_{t-2}	-0.321	-1.64	-0.342	-1.934*
$RMPPO_t$	0.059	2.94**	0.066	3.50**
$RMNRP_t$	-0.164	-1.48	-0.173	-1.74*
TIME	19.178	2.74**	20.032	3.15**
$\bar{R}^2$	0.999		0.999	
SEE	32.948		29.56	
D.W.	2.212		2.234	
Durbin-h	-			
$LM\chi^2(1)$	3.503			
F	3792.50*			

Notes: *significant at 5% level.
**significant at 1% level.

TABLE 2. PRICE ELASTICITIES OF MALAYSIAN PALM OIL

Dependent variables	Short-run	Long-run
Own-price		
Area	0.055	0.292
Yield	-0.122	0.025
Domestic consumption	0.038	0.192
Exports	-0.388	-0.457
Imports	0.644	-1.143
Cross-price		
Area - natural rubber price	-0.032	-0.17
Dom. consumption - coconut oil price	0.04	0.205
Export - soyabean oil price	0.103	0.122

The short-run own-price and cross-price elasticities are 0.055 and -0.032 respectively. The total coefficient estimated for lagged hectares is nearly unity. The long-run own-price and cross-price elasticities are inelastic, *i.e.* 0.292 and -0.17 respectively. These results indicate that the change in either palm oil or natural rubber price is not very important in determining the total area of oil palm in Malaysia, even in the long-run. This can be due to the existence of suitable land constraint.

Yield

Overall, $\bar{R}^2$ indicates that only 38% of the variation in oil palm yields during the sample period is explained by the specified variables. It is acknowledged that other factors such as rainfall, chemical and fertilizers, and labour are likely to have important effects on oil palm yield but their data were unavailable for estimation.

Both OLS and 2SLS estimations are statistically acceptable. Again, even though the problem of auto-correlation cannot be detected by the Durbin-h statistic in OLS, the LM test shows that there is no strong evidence of first-order auto-correlation. As expected, technology in palm oil production such as improvements in pollination and the uses new high-yield varieties is significant in determining the yield of FFBs of Malaysian oil palm. Current and lagged one-year prices of palm oil are also significant at the 5 % level. However, the short-run and long-run price elasticities of yield are -0.122 and 0.025, *i.e.* both are inelastic.

Domestic Consumption

The results in *Table 4* show the important factors in determining Malaysian palm oil consumption [equation

TABLE 3. ESTIMATED OIL PALM AREA EQUATION (2.3) OVER THE PERIOD 1970-1999, (n=30)

Variable	OLS		2SLS	
	Coefficient	t-ratio	Coefficient	t-ratio
Constant	11.478	2.95**	11.659	3.24**
YLD_{t-1}	.271	1.48	0.266	1.59
$RMPPO_t$	-0.002	-1.704	-0.002	-1.86*
$RMPPO_{t-1}$	0.002	2.161*	0.002	2.386*
TIME	0.090	2.166*	0.089	2.355*
$\bar{R}^2$	0.381		0.381	
SEE	1.573		1.436	
D.W.	1.709		1.702	
Durbin-h	-			
$LM\chi^2(1)$	2.819			
F	5.468**			

Notes: *significant at 5% level.
**significant at 1% level.

TABLE 4. ESTIMATED MALAYSIAN CONSUMPTION EQUATION (3.3) OVER THE PERIOD 1970-1999, (n=30)

Variable	OLS		2SLS	
	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-43.554	-1.13	-60.235	-1.65
MC_{t-1}	0.804	8.92**	0.804	9.62**
$RMPPO_t$	-0.018	-0.48	0.016	0.413
$RMPCO_t$	0.025	1.26	0.012	0.60
$MIPI_t$	2.023	3.17**	2.002	3.38**
$\bar{R}^2$	0.989		0.989	
SEE	48.342		44.844	
D.W.	1.794		1.729	
Durbin-h	0.597			
$LM\chi^2(1)$	0.363			
F	647.744**			

Notes: *significant at 5% level.
**significant at 1% level.

(3.3)]. The current level of consumption relies on one year lagged consumption and the level of Malaysian economic activity, which is proxied by the industrial production. In the short-run, given a 10% increase in industrial production index, the domestic consumption would only increase by 3%.

The coefficient of the current price of palm oil is negative while the coefficient of current price of coconut oil follows the expected sign. However, both coefficients are not statistically significant, implying that the consumption level of palm oil does not merely depend on the levels of both prices.

Exports

Table 5 illustrates the results of OLS and 2SLS estimations of exports equation (4.3) over the period of study. The Durbin-h and LM tests reveal no evidence of serial correlation in the reported results. The coefficient of exports lagged one year is statistically insignificant and also showing that the adjustment to the desired level of exports is very small due to the large amount of Malaysian palm oil exports, *i.e.* on average more than 90% of total production is exported every year.

TABLE 5. ESTIMATED MALAYSIAN EXPORTS EQUATION (4.3) OVER THE PERIOD 1970-1999, (n=30)

Variable	OLS		2SLS	
	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-13079.0	-6.40**	-12007.0	-6.36**
EXP_{t-1}	1.127	0.91	0.151	1.13
$RMPPO_t$	-0.973	-4.68**	-1.195	-4.77**
$RWPSO_t$	0.173	3.04**	0.180	3.26**
$WPOP_t$	3.429	5.44**	3.090	6.88**
$MEXC_t$	682.89	4.81**	620.99	4.43**
$IPIIC_t$	-13.702	-0.82	-4.232	-1.858*
$\bar{R}^2$	0.992		0.990	
SEE	232.77		219.28	
D.W.	1.978		2.042	
Durbin-h	-0.130			
$LMc^2(1)$	0.664			
F	565.54			

Notes: *significant at 5% level.
**significant at 1% level.

The coefficients of other variables, as expected are significant except for the industrial production index. The own-price elasticities of palm oil in the short- and long-run are in the inelastic range, *i.e.* -0.388 and -0.457 respectively. The estimated coefficient of soyabean oil price is also significant at the 1% level and its elasticity is very small. A 10% change of soyabean oil price is associated with an opposite response of palm oil exports of 1% in the short-run. Both results suggest that they are more inelastic than the results found by Shamsuddin and Arshad (1993), *i.e.* own-price and cross-price elasticities in the short-run of -0.45 and 0.4 respectively.

The world population influences the volume of palm oil exported. The short-run elasticity of population is 3.9. The Malaysian financial exchange rate is also important as a determinant of the quantity of Malaysian palm oil exports. Malaysian palm oil exports can be increased by about 8.6% for every 20% increase in the Malaysian Ringgit-US Dollar exchange rate. However, with increased industrialization of the consuming countries, there is a tendency to reduce palm oil consumption. Hence, the market for palm oil can be of greater potential in the less industrialized and populated countries. The quantity of palm oil exported tend to increase during times of weak Malaysian currency.

Imports

The results of the imports equation (5.3) are presented in *Table 6*. The coefficient of the Malaysian industrial production is found to be positive and statistically significant at the 1% level. Its elasticity is high, indicating that a one percent increase in industrial production would increase imports of palm oil by 2.2% in the short-run.

As expected, the coefficient of beginning stocks has a negative sign, and is significant at the 5% level. A 10% decrease in beginning stocks could increase Malaysian imports of palm oil by 6%, *i.e.* inelastic range. Therefore, imports provide substitutes for decreasing stocks. Results also show that imports lagged one year, domestic prices of palm oil and world price of palm oil are not statistically significant in determining the imports. The price elasticity of imports is low, implying that for every 10% increase in import price, imports tend to increase by 6% in the short-run.

Overall, the estimation results of the Malaysian palm oil market model are statistically acceptable and have identified many important factors related to area and yield of oil palm in Malaysia, as well as domestic consumption, exports and imports of palm oil.

The model was evaluated by a simulation analysis (Basri and Zaimah, 2002). The analysis indicated that the simulations performed are satisfactory and provided better predictions than the naive method.

CONCLUSION

This study presents an analysis of the domestic structure of the Malaysian palm oil market. The Malaysian palm oil industry has undoubtedly made significant contributions towards the domestic economy as well as to the development of the world palm oil market. Apart

TABLE 6. ESTIMATED MALAYSIA IMPORTS EQUATION (5.3) OVER THE PERIOD 1970-1999, (n=30)

Variable	OLS		2SLS	
	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-64.672	-1.73*	-81.436	-2.31*
IMP_{t-1}	-0.061	-0.32	-0.069	-0.39
$RMPPO_t$	0.006	0.15	0.048	1.24
$MIPI_t$	2.522	4.96**	2.418	5.00**
$RWPPO_t$	-0.002	-0.19	-0.012	-1.10
$MBSTK_t$	-0.083	-2.07*	-0.092	-2.19*
$\bar{R}^2$	0.873		0.866	
SEE	42.542		39.093	
D.W.	1.918		1.789	
Durbin-h	-			
$LMc^2(1)$	0.087			
F	40.938**			

Notes: *significant at 5% level.
**significant at 1% level.

from fertile soils, favourable weather and political stability, proper management and effective implementation of programmes and policies by private and public sectors have also contributed to successful development. Malaysia's ability to compete for increasing market shares has resulted in the rapid expansion of palm oil production over the last three decades. The success of the crop itself lies mainly in its high productivity, relatively low production costs and high degree of profitability.

A structural model developed to describe the Malaysian palm oil industry and discussed in this paper found that technology and total oil palm area lagged one year significantly influence the current total area of oil palm. Technology is also found to influence the yield of the oil palm trees, indicating that research activities into the development of technologies and management techniques that are cost reducing through productivity and quality improvements are crucial.

Total oil palm area planted is also found to significantly respond to own and rubber prices. The degree of response is however inelastic. This is consistent with the nature of the oil palm, which is a perennial crop and therefore is slow to react to changing market forces.

While Malaysian domestic palm oil consumption can be explained by quantity consumed in the past year and by the current level of industrial activity, the amount of palm oil exported is highly dependent on the world population, the level of industrial activity, the price of palm oil, and the price of soyabean oil as the main competitor for palm oil in the world. Hence, when palm oil prices are at a discount relative to soyabean oil, we can expect export uptake to increase. When new markets are to be identified and penetrated, priority should be given to more populous and less industrialized countries.

The structural model discussed here has also exposed that the financial exchange rate played an important role in explaining the quantity of palm oil exported. The recent economic crisis that reduced the value of the Ringgit through foreign exchange adjustment encouraged greater export of palm oil. The reduction in the value of the Ringgit relative to other currencies cheapened Malaysian palm oil in the world market, resulting in an increased uptake by foreign buyers.

The general economic performance of Malaysia as well as the rest of the world is also an important determinant of the level of Malaysian palm oil consumption and export. This factor is derived from the increased purchasing power of domestic and foreign consumers, which, to a certain extent has an increased tendency to consume palm oil.

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